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Roll No

BT-301(AU/CE/CM/EC/ME)-CBGS

B.Tech., III Semester

Examination, December 2020

Choice Based Grading System (CBGS)

Mathematics-III

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

iii) Draw neat sketches, if required.

iv) In case of any doubt or dispute the English version question should be treated as final.

1. a) Find a positive value of $(17)^{\frac{1}{3}}$ correct to six decimal places by Newton-Raphson method.

b) Find the real root of the equation $x \log_{10} x = 1.2$ by bisection method correct to four decimal places.

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PTO

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2. a) Evaluate $\int_1^2 \frac{1}{x} dx$ by Simpson's $\frac{1}{3}$ rd rule.

b) Evaluate $\int_4^{5.2} \log e^x dx$ by Simpson's $\frac{3}{8}$ th rule.

3. a) Find $y(0.1)$ by Runge Kutta Method. Given
 $y'' = y^3, y(0) = 10, y'(0) = 5.$

$$y'' = y^3, y(0) = 10, y'(0) = 5$$

b) Use Euler's method to find $y(0.4)$ from the differential equation $\frac{dy}{dx} = xy, y(0) = 1, h = 0.1.$

4. a) Write three properties of Laplace transform.

b) Find the Laplace transform of

$$F(t) = \begin{cases} 1 & 0 \leq t < 2 \\ t-2 & 2 \leq t \end{cases}$$

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Contd...

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5. a) Find the probability of getting 4 heads in 6 tosses of fair coin.

b) What do you mean by probability density function?

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6. a) Solve the following system

$$10x + 2y + z = 9$$

$$2x + 20y - 2z = -44$$

$$-2x + 3y + 10z = 22$$

by Gauss-Seidel method to two places of decimal.

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b) If 10% of bolt's produced by a machine are defective. Determine the probability that out of 10 bolts, chosen at random

i) 1

ii) None

iii) At most 2 bolts will be defective

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7. a) The following table is given

$x:$	0	1	2	5
$y:$	2	3	12	147

What is the form of the function?

$x:$	0	1	2	5
$y:$	2	3	12	147

b) Find by the method of Regula Falsi a root of the equation $x^3 + x^2 - 3x - 3 = 0$ lying between 1 and 2.

10&

8. a) Find the Fourier transform of

$$f(x) = \begin{cases} 1 & \text{for } |x| < a \\ 0 & \text{for } |x| > a \end{cases}$$

b) The random variable x has a poisson distribution if $p(x = 1) = 0.01487, p(x = 2) = 0.04461$. Then find $p(x = 3)$.

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